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CONTENTS:

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THE BALTIMORE MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

THE seventh annual meeting was held in Baltimore, December 27, 28 and 29, in the geological rooms of Johns Hopkins University.

The first session took place at 10 A. M., December 27, and was presided over by President Chamberlin. The Society was welcomed by President Gilman, of the University, who made a graceful and cordial address, that was warmly received. President Chamberlin in reply expressed the feelings of the members in a few felicitous words. A printed report of the Council was distributed, reviewing the events of the year. B. K. Emerson and J. S. Diller were elected an auditing committee. The results of the ballot for officers were as follows:

President, N. S. SHALER.
1st Vice President, JOSEPH LE CONTE.
2d Vice President, C. H. HITCHCOCK.
Secretary, H. L. FAIRCHILD.
Treasurer, I. C. WHITE.
Councillors, R. W. ELLS, C. R. VAN HISE.

Messrs. Clements, Cobb, Hopkins, Hubbard and Spurr were elected fellows.

The constitution was so amended that the qualifications for fellows shall hereafter be as follows, geographical location in North America being no longer a requisite, "Fellows shall be workers or teachers in geology." An amendment allowing the Treasurer to be elected without limit was also passed. After some announcements by the local committee the Society listened to a memorial of the late Professor George H. Williams, of Johns Hopkins University, and Second Vice President of the Society, by Professor William B. Clark. It was on Dr. Williams' invitation that the Society met in Baltimore and the great loss to the science by his death was the thought uppermost in the minds of all present. Dr. Clark's graceful and touching memorial to his late colleague was appreciated by all

present. Brief additional tributes were also paid by Professor B. K. Emerson, of Amherst, Dr. Williams' first geological teacher and life-long friend; by J. F. Kemp, an old college-mate; by W. S. Bayley, his first student in petrography, and by his friends and colleagues, J. P. Iddings, I. C. White, C. D. Walcott and N. S. Shaler.

A memorial of Amos Bowman, of the Canadian Survey, was then presented by H. M. Ami, after which the Society listened to the reading of papers, as follows:

1. *On Certain Peculiar Features in the Jointing and Veining of the Lower Silurian Limestones near Cumberland Gap, Tenn.* N. S. Shaler, Cambridge, Mass.

The paper described peculiar forms of dolomitic limestone near Smiles, Tenn., in practically undisturbed strata which are ribbed and seamed by minute veins of calcite, in the form of small gash veins. They were regarded as due to some powerful, though local strains in the rock, but the subject was frankly admitted to be an obscure one.

2. *The Appalachian Type of Folding in the White Mountain Range, of Inyo Co., Cal.* Chas. D. Walcott, Washington, D. C.

The White Mountain range, which lies east of the Sierra Nevada, was shown to consist of conformable quartzite and cambrian shales and limestone. The series had been thrown into synclinal folds with intervening eroded anticlines and with a structure which, on the whole, closely reproduces the Appalachian sections of the East.

The paper was discussed by Messrs. Becker, Ami, Willis and Russell, after which recess was taken until the afternoon session.

3. *New Structural Features in the Appalachians.* Arthur Keith.

The paper reviewed the old generalizations of Appalachian structure, analyzed the recently published knowledge, described new structures, such as fan structure, cross folds, cross zones of shear, a secondary system of folding, the distribution of metamorphism, and advanced a theory to account for their production. According to the theory, the compressive strain which deformed the strata began in the crystalline gneisses and granites, thrust the crystallines against the sediments and by the differential motion along the shear zones produced buttresses around which the chief changes of structure were grouped.

In the discussion which followed, Mr. C. Willard Hayes considered two of the shear zones with the conclusion that the changes in structure were due to differences of rigidity in the sediments when they were thrust against the crystallines.

Mr. Keith replied that the changes of structure extended through the crystallines as well as the sediments, a fact incompatible with a merely passive resistance on the part of the crystallines.

Mr. Bailey Willis argued that the chief structural changes were due to original differences in sediment and in bases of sedimentation. His conclusion was that the sediments moved against a rigid crystalline mass, being actuated by a force acting from the westward, which was due to the isostatic flow of material from beneath the load of sediment.

4. *The Faults of Chazy Township, Clinton County, N. Y.* H. P. Cushing, Cleveland, O.

That the Lake Champlain region is, structurally, one of faulting without folding, is well known. The structure is well exhibited in Chazy township, which has not heretofore been mapped in detail, except for a small area around Chazy village. Its consideration is of importance, because of its bearing on the structure of the Adirondack region, in which, on account of the lithological similarity of the rocks, the determination of the precise structural rela-

tions is a matter of great difficulty, if not impossibility. The great number of the faults, and the consequent small size of the various faulted blocks, are striking facts.

In discussion C. D. Walcott showed how these faults had led Professor J. Marcou to believe that he had discovered colonies of Trenton fossils in rocks of the Potsdam.

5. *The Formation of Lake-basins by Wind.* G. K. GILBERT, Washington, D. C.

The paper described the formation of basins in the arid regions of the West, by the erosive action of wind-blown sand upon a shale devoid of vegetation. In time they became filled with water and formed small lakes.

6. *The Tepee Buttes.* G. K. GILBERT and F. P. GULLIVER.

The paper was read by Mr. Gulliver and described a series of conical buttes west of Pueblo, Col. They consist of Pierre shales, surrounding cores of limestone formed of shells of *Lucina*. It is supposed that as the shales were deposited, a colony of lucinas established themselves and grew upward pari passu, forming a conical or columnar deposit of limestone, whose greater resistance to erosion has left the buttes in relief.

7. *Remarks on the Geology of Arizona and Sonora.* W J McGEE, of Washington.

The arid region was described as consisting of north and south mountain ranges with wide valleys between. In Arizona the surface is largely of volcanic rock, in Sonora of Mesozoic limestone. The rivers have definite courses and water in the mountains, but in the valleys they are lost by evaporation and absorption before the ocean is reached. Their valleys were transverse to the mountains and larger valleys because of the general southwesterly dip of the rocks. Buttes near the Gulf of California show slight talus, which fact gives good ground for thinking that the gulf has stood at an altitude, as regards the land, several hundred feet above its present level in recent geological time, or, in other words, that the land has been depressed by that amount.

8. *Geology of the Highwood Mountains, Montana.* WALTER H. WEED, Washington, D. C., and LOUIS V. PIRSSON, New Haven, Conn.

On account of the illness of Mr. Weed this paper was not read.

9. *Genesis and Structure of the Ozark Uplift.* CHARLES R. KEYES, Des Moines, Iowa.

On account of the author's absence the paper was not read.

10. *The Geographical Evolution of Cuba.* J. W. SPENCER, Washington, D. C.

The description of the physical geography of Cuba and of the adjacent submerged banks was given. Exclusive of a few areas locally older, the apparent basement is composed of volcanic rocks of Cretaceous or slightly earlier date. These are succeeded by fossiliferous Cretaceous sands, etc., and limestone greatly disturbed. The Eocene and Miocene deposits form a physical unit, and are composed mostly of limestone having a thickness of from 1,900 to 2,100 feet. The Pliocene period was mostly one of high elevation, accompanied by a very great erosion. At the close of the Pliocene period the Matanzas subsidence depressed the island so as to leave only a few small islets, and permit of the accumulation of about 150 feet of limestones. Then followed the great Pleistocene elevation with the excavation of great valleys, the lower portions of which are now fjords reaching in one case at least to 7,000 feet in depth before joining the sea beyond. The elevation was followed by the Zapata subsidence, reducing the island to smaller proportions than to-day, and permitting the accumulation of the loams and gravels like the Columbia of the continent. The subsequent minor undulations are also noted, as shown

in terraces and recent small cañons now submerged. Also the modern coralline formations and harbors are notable.

On the completion of the paper the Society adjourned its business session until the following morning.

In the evening many members attended Professor Wm. Libbey's lecture on Greenland, and afterwards the reception which was hospitably tendered the visiting societies by the Johns Hopkins University in McCoy Hall. On reassembling Friday morning the council presented some minor points of business, and Mr. J. S. Diller, the chairman of the committee on photographs, read his annual report. It showed that some 1,200–1,500 photographs of geological phenomena and scenery had been presented to the Society, the same being on exhibition in the hall. The negatives of the U. S. Geol. Survey in many instances and also those of not a few geologists have been made accessible to the fellows for prints at cost. Mr. Diller finally tendered his resignation, which was accepted with regret. Mr. G. P. Merrill, of the U. S. National Museum, was appointed to the vacancy. The committee now consists of G. P. Merrill, W. M. Davis and J. F. Kemp.

The first paper on the programme was—

11. *Observations on the Glacial Phenomena of Newfoundland, Labrador and Southern Greenland.* G. FREDERICK WRIGHT. Oberlin, Ohio.

Note was made of the direction of the glacial scratches in Newfoundland and of the evidences of a preglacial elevation of the island; also of the contrast between the flowing outlines of the coast range of mountains in Labrador and the jagged character of the coast range of Southern Greenland. A description was also given of the projection of the inland ice which comes down to the coast near Sukkertoppen, in Lat. 65° 50′, and of the phenomena which indicate the former extension of the Greenland ice far beyond its present boundaries. Still, the bordering mountains were never covered with ice.

12. *Highland Level Gravels in Northern New England.* C. H. HITCHCOCK, Hanover, N. H.

Recent observations prove the existence of a glacial lake in the basin of Lake Memphremagog, whose beaches exceed a thousand feet above sea level, and others 1,500 feet above sea level in northern New Hampshire. The author wished to present a preliminary notice of what may prove to be of great service in a more exact definition of glacial work in New England and Canada.

The paper was discussed by Professor J. W. Spencer, who spoke of his own studies in the same region.

During the reading of the following six papers the petrographers and mineralogists adjourned to the room above and listened to the reading of papers of a petrographic character, as subsequently outlined. The principal session then listened to the following:

13. *Variations of Glaciers.* HARRY FIELDING REID.

The paper called attention to the desirability of keeping accurate records of the movements of glacial ice wherever possible. A committee was appointed to further this movement at the Geological Congress in Zurich last summer, and the writer urged the importance of the work, especially as regards our western glaciers.

14. *Discrimination of Glacial Accumulation and Invasion.* WARREN UPHAM, Somerville, Mass.

The accumulation of ice-sheets by snowfall on their entire area was discriminated from an advance or invasion by the front of the ice, extending thus over new territory. The former condition is shown to have been generally prevalent, on the gla-

ciated portions of both North America and Europe, by the occurrence of comparatively small areas of ice accumulation beyond the extreme boundaries of the principal ice-sheets. The latter condition, or ice invasion, is indicated on the outer part of the drift-bearing area eastward from Salamanca, N. Y., through Staten and Long Islands, Martha's Vineyard and Nantucket, where the soft strata beneath the ice were dislocated and folded.

15. *Climatic Conditions Shown by North American Interglacial Deposits.* WARREN UPHAM, Somerville, Mass.

During the times both of general accumulation and growth of the ice-sheets and of their final recession, fluctuations of their borders were recorded in various districts by forest trees, peat, and molluscan shells, enclosed in beds underlain and overlain by till. Such fluctuations, while the ice accumulation was in progress, enclosed chiefly arctic or boreal species; but when the ice was being melted away, in the Champlain epoch, the remains of the flora and fauna thus occurring in interglacial beds, as at Toronto and Scarboro', Ont., may belong wholly to temperate species, such as now exist in the same district. The cold climate of the Ice age appears thus to have been followed by a temperate Champlain climate close upon the waning ice-border.

16. *Glacial Lakes in Western New York and Lake Newberry, the Successor of Lake Warren.* By H. L. FAIRCHILD, Rochester, N. Y.

The paper presented evidence that the finger lakes of central New York were all pre-glacial in character and that during the presence of the ice-sheet at their outlets they were backed up and discharged southward, as is abundantly shown by deltas at various heights on both sides of the present divide. Professor Fairchild cited eighteen glacial lakes from Attica on the west to the Onondaga river valley on the east. These he has named from important towns now on the sites, as Lake Ithaca for the glacial form of Cayuga lake, which was 35 miles long, 5–10 miles broad and 1100 feet deep. It has been long known that when the ice covered western New York the great lakes discharged at Chicago to the Mississippi and the great lake formed by them is called Lake Warren, and has left a good beach. At a much later stage, when the Mohawk was uncovered, the waters ran to the Hudson, and the great lake on the site of Ontario has been called Lake Iroquois. The intermediate stage between these two, when the discharge of the water covering western New York was through the low pass at the south end of Seneca lake through Horseheads near Elmira, Professor Fairchild has called Lake Newberry. The elevations of this and the Chicago pass are such that when allowance is made for the depressed condition of the area at that time, the existence of the lake can be demonstrated.

The paper was discussed by Messrs. McGee and Gilbert, who commended the choice of the new name as felicitous and timely. J. W. Spenser also spoke, but differed with the author in some points.

Meantime, in the upper laboratory (the Williams room), the petrographic section, under the chairmanship of Professor B. K. Emerson listened to

18. *The Relation of Grain to Distance from Margin in Certain Rocks.* ALFRED C. LANE, Houghton, Michigan.

A description of the variation in texture and grain of some quartz diabase dikes of Upper Michigan was given, and the same compared with effusive flows of similar mineral composition. These descriptions were based on series of thin sections of known distance from the margin. Interstitial micropegmatite is primary or pneumatolytic, and the feldspar crystallization begins before that of the augite, continuing until later. The distinction between the

intrusive or dike type and the effusive type was pointed out. The main object of presenting the paper at this time is to elicit the best methods of measuring the coarseness of grain of a rock, the object being to express by some arithmetical or mathematical formula based on statistics, or in some other definite way, the relation of texture to walls and thickness in a dike. The paper elicited considerable discussion by Messrs. Hovey, Kemp, Iddings, Cross, and G. P. Merrill, in which the following points were made; the large size of the phenocrysts in some very narrow dikes; the importance of not measuring minerals of the intratelluric stage; the great variability of circumstances under which dikes cooled, as heated or cold walls, pressure, mineralizers, etc., and the difficulties of getting reliable data of the kind required by Dr. Lane.

19. *Crystallized Slags from Coppersmelting.* ALFRED C. LANE, Houghton, Michigan.

This paper described (with exhibition of specimens) slags from the cupola furnaces used in coppersmelting, which contained large melilite crystals, between one and two centimeters square, interesting optically and in mode of occurrence. Crystallized hematite was also noted.

The specimens elicited great interest on account of the size and perfection of the crystals.

20. *On the Nomenclature of the fine-grained Siliceous Rocks.* L. S. GRISWOLD, Cambridge, Mass.

The writer described the difficulties met first, in his study of novaculite, and later, in connection with other siliceous rocks, such as cherts, jaspers, etc., in applying definite names. The troublesome characters of opaline, chalcedonic and quartzose silica, as regards the origin of each, presented obstacles both for mineralogic and genetic classification.

This paper elicited an interesting discussion which threatened at times to take up the whole subject of the classification of rocks. The general feeling seemed to be that rocks could best be named primarily on a mineralogic and textural basis, and that these principles furnished the best solution of the difficulties presented by the paper. The speakers were Messrs. Wolff, Emerson and Lane.

21. *On Some Dykes containing 'Huronite.'* By ALFRED E. BARLOW, Ottawa. (Read by F. D. ADAMS.)

This paper contained a brief petrographical notice of certain dykes of diabase containing 'Huronite,' as the mineral was originally named by Dr. Thomson, of Glasgow, in his Mineralogy of 1836. Dr. B. J. Harrington's re-examination of this mineral in 1886 showed some very grave errors in Thomson's work and the 'huronite' must simply be regarded as an impure or altered form of anorthite, which has undergone either partial or complete 'saussuritization,' owing to metamorphic action. Certain localities were mentioned north and northeast of Lake Huron, where these dykes have been noted cutting the Huronian as well as the granitoid gneisses usually classed as Laurentian. Mr. A. P. Low, of the Canadian Geological Survey, noticed dykes containing this mineral cutting the Laurentian and Cambrian in the Labrador Peninsula.

22. *The Granites of Pike's Peak, Colorado.* EDWARD B. MATHEWS, Baltimore, Maryland. (Introduced by W. B. CLARK.)

This paper gave an areal and petrographical description of the granites composing the southern end of the Rampart or Colorado range and showed that great macroscopic variation may result, while the microscopic characters remain monotonously uniform. Four types in all were distinguished, based on the size of phenocrysts and coarseness of grain. The paper was discussed by Whitman Cross and J. P. Iddings, after which the section adjourned to meet again at 4:30 P. M.

About the same time the main section also adjourned for lunch, which was most hospitably served to the visiting societies in the Johns Hopkins gymnasium. High praise is due the local committee for the excellent arrangements. After lunch the society reconvened and the first paper was:

23. *Notes on the Glaciation of Newfoundland.* By T. C. CHAMBERLIN.

The paper brought out the very interesting facts that the glaciation of Newfoundland is local and that the moraines and striæ show that it proceeded from the center of the island to the coast. The drift is all peripheral and can be easily traced to its sources.

24. *The Pre-Cambrian Floor of the Northwestern States.* By C. W. Hall. (Read in the absence of the author by WARREN UPHAM.)

The paper pointed out the distribution of the Pre-Cambrian areas in the territory under investigation so far as it is known at the present time. It then showed by means of records of deep and artesian well borings, within reasonable limits of probability, the depth of the Pre-Cambrian rocks over a considerable area beyond the surface area outlined.

Maps and a series of profiles accompanied the paper.

The paper was discussed by G. K. Gilbert, who called attention to the importance of the results.

25. *A Further Contribution to Our Knowl- of the Laurentian.* FRANK D. ADAMS, Montreal, Canada.

After referring briefly to the author's previous work on the anorthosite intrusions of the Laurentian, the paper gave a condensed account of the results of a study of the stratigraphical relations and petrographical character of the gneisses and associated rocks of the Grenville series in that portion of the protaxis which lies to the north of the Island of Montreal. By means of lantern slides Dr. Adams gave a very graphic account of the region in question. Some thin sections of rocks as large as an ordinary lantern slide were used to illustrate the passage of a massive rock into a crushed and sheared or gneissoid form. The paper formed not only an important contribution to the geology of the region, but to our knowledge of dynamic metamorphism as well. Discussion was reserved until after the reading of the next two.

26. *The Crystalline Limestones, Ophiolites, and Associated Schists of the Eastern Adirondacks.* J. F. KEMP, New York.

After a brief introduction and sketch of what others had done on the subject in hand, the areas of these rocks, especially in Essex county, were outlined and described with geological sections. It was shown that they are generally small, usually less than a square mile; that they consist of (*a*) white graphitic crystalline limestone, with great numbers of inclusions of silicates, (*b*) of ophiolites, (*c*) of black garnetiferous hornblende schists, (*d*) of lighter quartz schists, and (*e*) in one area, of closely involved granulite very like the Saxon granulite. The evidence of the plasticity of limestone under pressure was graphically shown by lantern slides. The trap dikes that often cut the limestones were referred to, and the relations with the intrusive gabbros were set forth, and the argument made that the limestones are older than the gabbros and anorthosites of the Norian series, and that they are the remnants of an extended formation which was cut up by these intrusions, metamorphosed largely by them and afterward eroded. A comparison was drawn with those on the western side of the mountains.

27. *The Relations of the Crystalline Limestones, Gneisses and Anorthosites in St. Lawrence and Jefferson Counties, N. Y.* C. H. SMYTH, JR., Clinton, N. Y.

The paper dealt especially with areas in

the towns of Diana, Pitcairn and Wilna, but was really a review of the relations of these rocks in a wider region and was based on extended field experience. Petrographic details were presented of the several kinds of rocks, and especially of the varieties of the anorthosites, which were shown to shade into angite-syenites, and apparently into red gneiss. Many irruptive contacts of anorthosites and limestone were cited and the location of the classic mineral localities of this region was shown to be along these contacts. The same important thesis was worked out as in the preceding two papers, that the great intrusions of the Norian series were later than the gneisses and limestones.

The papers were discussed by Whitman Cross, who called attention to the close parallelism of the geology in the Pike's Peak district of Colorado; and by C. D. Walcott who referred to his own studies in the Adirondacks and similar conclusions to those advanced.

28. *Lower Cambrian Rocks in Eastern California.* Charles D. Walcott, Washington, D. C.

An account of the discovery of the Lower Cambrian rocks and fauna in the White Mountain range of Inyo County, Cal. See also No. 2 above. This important discovery affords a means of correllating the early Cambrian life in the remote West with those already known in the East.

29. *Devonian Fossils in carboniferous strata.* H. S. Williams, New Haven, Conn.

The paper described the fauna of the Spring Creek limestone of Arkansas, which lies between the Keokuk-Burlington strata below and the Batesville sandstone above, and is at about the horizon of the Warsaw and Chester of the Lower Carboniferous in the Mississippi Valley. The fossils are closely related to the carboniferous fauna described by Walcott from Eureka, Nev., and by J. P. Smith from Shasta County, Cal. But certain Devonian forms as *Leiorhyncus quadricostatum* and *Productus lachrymosus* of the New York Devonian are found with them, which are lacking in the Mississippi Valley, but are found in the Devonian of the West. The interpretation was then made, that the Arkansas fossils indicated a Devonian incursion from the westward.

During the reading of this and the succeeding titles the petrographers reconvened in the upper laboratory, as later recorded.

30. *The Pottsville series along the New River, West Va.* David White, Washington, D. C.

This paper was a careful description of the stratigraphy of the series, the determinations being based on the fossils, which evidence was presented in full.

31. *The Cretaceous Deposits of the Northern Half of the Atlantic Coast Plain.* Wm. B. Clark, Baltimore, Md.

The several formations established as a result of a detailed study of the Cretaceous strata of Monmouth county, New Jersey, were shown to have a wide geographical range towards the south. They have been traced throughout the southern portion of that State, while all except the highest members of the series are found crossing Delaware and the eastern shore of Maryland. Several representatives of these formations appear on the western shore, reaching to the banks of the Potomac.

32. *Stratigraphic Measurements of Cretaceous Time.* G. K. Gilbert, Washington, D. C.

The writer described a great series of Cretaceous rocks, 3500–4000 ft. thick, lying in the Arkansas River Valley, west of Pueblo, Colo. They consist of layers of limestone 1 ft. to 1 ft. 6 in. thick, separated by 1 in. of shale—this alternation being uniformly repeated through the whole thickness. The writer argued that frequent continental oscillation from deep to shallow water deposits was unlikely as having caused

the beds, and hence appealed to climatic cycles.

The cycles of a year's changing seasons is too short to account for the limestone; the next longer cycle, the lunar, involves no changes of climate; hence the cycle of the precession of the equinoxes, 21,000 years long, was selected, and allowing four feet of deposit for each cycle, this portion of Cretaceous time was estimated at 21,000,000 years.

There was no discussion, but a very evident feeling of solemnity at the announcement.

33. *Notes on the Cretaceous of Western Texas and Coahuila, Mexico.* E. T. DUMBLE, Austin, Texas.

The author being absent the paper was only read by title.

The main section then adjourned until the presidental address at 7:30 the same evening. Meantime the petrographers listened to

34. *Spherulitic Volcanics at North Haven, Maine.* W. S. BAYLEY, Waterville, Me.

In the Journal of Geology a few months ago the late Dr. George H. Williams referred to the existence of old rhyolites on the coast of Maine. The author described very briefly the occurrence of these rocks, and exhibited specimens of them. The specimens showed very perfect spherulites, lithophysæ and all the common features of glassy volcanics. They brought out an interesting discussion regarding the abundance of these rocks along the Altantic sea-board. J. E. Wolff spoke of their great extent near Boston, and especially at Blue Hill, where the relations with the Quincy granite are a hard problem. A. C. Lane mentioned their frequency in central Maine, as shown by the collections of L. L. Hubbard. T. G. White referred to those near Mt. Desert. J. F. Kemp spoke of recent field and petrographic work in progress on the great areas near St. John, N. B. W. S. Yeates brought up the curious phosphatic spherulites lately found in Georgia, which closely simulate lithophysæ, and remarks were made on them by W. Cross and J. P. Iddings.

35. *The Peripheral Phases of the Great Gabbro Mass of Northeastern Minnesota.* W. S. BAYLEY, Waterville, Me.

On the northern border of the great gabbro mass in northeastern Minnesota are basic and granulitic rocks whose composition indicates their relationships with the gabbros with which they are associated. The basic rocks are aggregates of the basic constituents of the gabbro. They are characterized especially by the abundance of titanic iron. The granulitic rocks differ from the central gabbro mainly in structure. They consist of aggregates of rounded diallage, hypersthene and plagioclase, all of which minerals are present also in the normal rocks. The basic rocks are probably differentiated phases of the gabbro, of earlier age than the great mass of the normal rock. The granulitic phases are simply peripheral phases. Closely parallel cases were brought out in the discussion as existing in the Adirondacks (by C. H. Smyth, Jr., and J. F. Kemp), and in Quebec (F. D. Adams), where they have been been called granulites, augite-syenites and augite gneisses. H. D. Campbell mentioned the same phenomena in similar rocks in Rockbridge county, Virginia, and all the speakers commented on the peculiar development of orthoclase feldspar in the border facies of a gabbro mass.

36. *The Contact Phenomena at Pigeon Point, Minn.* W. S. BAYLEY, Waterville, Me.

The speaker distributed copies of his recent Bulletin U. S. Geol. Survey, No. 109, and exhibited a series of specimens which illustrate the peculiar contacts and transition rocks at Pigeon Point. Discussion followed by by J. P. Iddings and others.

37. *A New Discovery of Peridotite at Dewitt, 3 miles east of Syracuse, N. Y.* N. H. DARTON. *Petrography of same,* J. F. KEMP.

Mr. Darton described the opening up of this new boss of peridotite in the building of a reservoir. The wall rock is Salina shales, and the geological section of that part of the state was outlined in explanation. J. F. Kemp described the rock as a very fresh peridotite as these rocks go, with perfectly unaltered olivines and a ground mass of small augite crystals, with what was probably originally glass. Gabbroitic segregations were also mentioned containing feldspar. The interest of the rock lies in the fact that it gives much fresher material than that described by Dr. G. H. Williams from Syracuse, in which the larger original minerals were represented only by alteration products. No perofskite or melilite could be found in the Dewitt material.

Professor B. K. Emerson exhibited remarkable pseudomorphs of olivine from a rediscovered though long lost mineral locality in Massachusetts, and corundum with interesting enclosures.

The section then adjourned with the intention of having an exhibition of rock sections the following morning in the same place.

A goodly audience greeted President Chamberlin at 7:30 in the evening for the annual presidential address, the subject being *Recent Glacial Studies in Greenland.* The speaker brought out the distribution of the ice sheet over Greenland, described his observations at Disko Bay and elsewhere and his final location at Lieut. Peary's station, Inglefield Gulf. Many peculiar features of Greenland glaciers were brought out, such as their rampart-like terminal cliffs, their general foliation or banding and enclosed debris, their causeways of morainic material, etc. The glaciation is thought to be now near its maximum extent because just beyond the ice are unglaciated areas and jagged islands that have never been covered. A large series of lantern views followed and brought out still more forcibly the points of the address. President Chamberlin was listened to with close attention during the two hours occupied, and all thoroughly enjoyed the lecture, but it is nevertheless true that an hour and a quarter, or at most an hour and a half, is about as long as a speaker can wisely keep a general audience.

The Society reassembled in the geological laboratory about ten o'clock for the annual supper. After an excellent ménu had been cared for, Professor B. K. Emerson was chosen toastmaster, and by his characteristic sallies, in which he was ably aided by several speakers, resolved his hearers into intermittently active spiracles of mirth upon the lava stream of his wit.

When the Society reassembled on Saturday morning the first paper read was

38. *The Marginal Development of the Miocene in Eastern New Jersey.* Wm. B. Clark, Baltimore, Md.

The deposits which characterize the marginal phase of New Jersey Miocene in Monmouth and Ocean counties were especially discussed. The gravels, sands and clays were considered and their relations shown, together with the occurrence of glauconite in certain areas. The connection of the strata in the northern counties with the highly fossiliferous beds in South Jersey was explained. The paper was discussed by N. H. Darton bringing out some slight divergence of views on the classification of the deposits, in that the discovery of fossils by W. B. Clark had somewhat revised the earlier stratigraphic work.

39. *Sedimentary Geology of the Baltimore Region.* N. H. Darton, Washington, D. C.

An account of the local geology of Mesozoic and Cenozoic formations and some statements regarding certain unsolved problems in coastal plain geology, illustrated by maps and sections. The sections which passed through the crystallines of the Piedmont plateau and the city of Baltimore

brought out admirably the relations of the later sediments to the older protaxis.

40. *The Surface Formations of Southern New Jersey.* ROLLIN D. SALISBURY, Chicago, Ill.

The surface formations of southern New Jersey, which have often been grouped together under the names, 'Yellow Gravel' and 'Columbia,' are believed to be divisible into five formations, the oldest of which greatly antedates the glacial period. The several formations are unconformable on each other and are believed to have been widely separated in time of origin. These formations were called the (1) Beacon Hill, (2) Canasaucon (the spelling may be wrong), (3) Jamesburg, (4) Trenton and the (5) Keyport. It is impossible as yet to say which are Columbia and which not, but (2) is probably Pleistocene, and formed during ice action on the north. Nothing later than (3) is Columbia. The paper was discussed by Warren Upham.

41. *New Forms of Marine Algæ from the Trenton Limestone, with Observations on Buthograptus laxus, Hall.* R. P. WHITFIELD, New York. (The paper was read by E. O. HOVEY.)

Certain fossils from Platteville, Wis., referred years ago by Hall with doubt to the graptotiles, were shown to be really articulated, marine algæ, and referable to several species. True corallines from the same horizon at Middleville were also described which are much older than any hitherto mentioned members of this group of plants.

42. *On the Honeycombed Limestones in the Bottom of Lake Huron.* ROBERT BELL, Ottawa, Canada. (Read by H. M. AMI.)

The Limestones over a certain region in the bottom of Lake Huron are extensively eroded in a peculiar manner which the writer calls honeycombing and pitting. He described this condition, the area within which it is found, the depth of the water and other conditions most favorable to its production and then attempted to account for its origin, enumerating various possible causes which might suggest themselves, and giving the most probable one, namely, a differential solubility of the rock in the presence of slightly acidulated water. Reasons in support of this view were stated. The geological ages and the lithological characters of the various limestones attacked were mentioned in trying to arrive at the conditions which produce the phenomena described. The localization of this form of erosion may be attributed to a slight acidity of the water in that part of Lake Huron, and reasons are given for believing that an acid condition actually exists. In addition to the considerations due to the structure and composition of the rock lying at the bottom of such water, certain external conditions were mentioned as favoring the honeycombing process, which appears to be still in active progress. Examples were given of somewhat similar erosion elsewhere, but the typical honeycombing here described appears to be confined to Lake Huron. The paper was illustrated by specimens and photographs.

43. *On the Quartz-keratophyre and its Associated Rocks of the Baraboo Bluffs, Wisconsin.* SAMUEL WEIDMAN. (Read by J. P. IDDINGS.)

In the vicinity of Baraboo, Wisconsin, occur acid porphyritic rocks which correspond chemically with quartz-keratophyres. They exhibit under the microscope fluxion, spherulitic, poicilitic, and other structures of volcanic rocks, and are associated with volcanic breccias which show them to have their origin in a surface flow. They are of Pre-Cambrian age, since they rest upon the upper Huronian quartzite and are overlaid by the Potsdam sandstone and conglomerate. In some portions of the area they have been completely changed to finely foliated sericite schists through the orographic movement which elevated the quartzites to form the Bluffs.

44. *The Characteristic Features of the California Gold Quartz Veins.* Waldemar Lindgren, Washington, D. C.

The writer described the extent and associations of the veins, bringing out the fact that they are in all manner of wall rocks, although especially in the auriferous slates. They were shown to be true fissure veins that cut the walls at all angles, although mostly along the strike. Direct issue was taken with the view that they are replacements of limestone or related rock, for it was shown that while the veins are siliceous and filled with quartz, the wall rocks have very generally suffered carbonatization. Finally the source of the gold was placed in deep seated regions, whence it had been brought by uprising solutions.

On the conclusion of the paper, the customary votes of thanks were passed to the local committee, to the Johns Hopkins University and to others whose efforts had made the session a success. The next place of meeting, a year hence, has not been settled. On the whole, the meeting was the best attended and most interesting and successful yet held. J. F. Kemp.

Columbia College.

THE BALTIMORE MEETING OF THE AMERICAN MORPHOLOGICAL SOCIETY.

The Society met on Thursday morning in the lecture room of the Chemical Building and again upon Friday afternoon, adjourning for the intermediate sessions of the Society of Naturalists. In the absence of Professor C. O. Whitman, President of the Society, Professor W. B. Scott, of Princeton, Vice-President, took the chair. Among those present at these sessions besides those who presented papers were Alpheus Hyatt, Edward S. Morse, Edward D. Cope, Samuel F. Clarke, C. F. Herrick, Henry F. Osborn, E. A. Andrews, W. H. Dall.

The officers elected for the year 1895 were:

President—Professor Edmund B. Wilson, Columbia College.

Vice-President—Professor W. B. Scott, Princeton College.

Secretary and Treasurer, Dr. G. H. Parker, of Harvard University.

The following are abstracts of the papers presented:—

Dr. C. W. Stiles, of the U. S. Agricultural Bureau, presented the first paper upon *Larval Stages of an Anoplocephaline Cestode* and exhibited specimens of Distoma (Polyorchis) molle (Leidy, '56), S. & H., '94; of Dioctophyme gigas, Rud., and of Distoma tricolor, S & H. Five hundred of the last named species are ready for distribution as exchanges to college zoölogists.

Professor William A. Locy, of Lake Forest University, presented the first paper on *Primitive Metamerism in Selachians, Amphibia and Birds.* It has been generally assumed that the metameric divisions of the Vertebrates depend primarily on the middle germ-layer, and that whenever they appear in the ectoderm they are secondarily moulded over the mesodermic segments. This proposition is not supported by these observations. We find in very young embryos of amphibians and birds, primitive metameric divisions which effect the entire epiblastic folds and in Selachians extend also out into the germ-ring. They are present before any protovertebræ are formed and are most clearly marked in the border regions. These segments become later coincident with the so-called neuromeres, but it is to be noted that they are by no means confined to the neural tube. The time-honored designation 'metamerism of the head' should be interpreted as meaning regional metamerism not as a different form of segmentation from that which affects the trunk region. This paper was discussed and the accuracy of the author's observations was questioned because of the conspicuous character which he assigned to

certain surface markings never observed by others. The opportunity given for examining the specimens, however, proved that the markings could be faintly seen as described by the author.

Dr. Locy's second paper was a *Note on the Homologies of the Pineal Sense-Organ.* The basis for determining homologies of the two epiphysial outgrowths of Petromyzon, Teleosts and Lacertilia has been furnished by recent publications by Studnicka, Hill and Klinckowström. Basing a comparison upon innervation and also upon the history of the vesicles, we may regard the upper epiphysial vesicle in Petromyzon as corresponding to the epiphysis of Teleosts and Lacertilia, and the lower epiphysial vesicle as equivalent to the anterior vesicle of Hill (which early absorbs) in the teleosts, and to the pineal eye in the Lacertilia.

Under the title: '*The Quadrille of the Centrosomes*' *in the Echinoderm egg; a second contribution to biological mythology*, Professor E. B. Wilson, of Columbia, presented the somewhat surprising results of his renewed investigation of the phenomena of fertilization in the eggs of the sea-urchin. Rabl had predicted in 1889 that the union of the germ-cells would be found to involve a conjugation of centrosomes or archoplasmic elements in addition to the well-known conjugation of nuclear elements. Fol's celebrated paper on the *Quadrille of the Centrosomes* in 1891 was apparently a triumphant fulfillment of the prediction, and, having been immediately and universally accepted, exercised an important influence on the current theories of inheritance. A prolonged research upon the eggs of *Toxopneustes variegatus* shows, with a high degree of certainty, that Fol's results were based on material prepared by defective methods; that his account of the origin of the archoplasm is fundamentally erroneous; that no 'Quadrille' occurs in the American species at least, and that his account of it is largely mythical. Results essentially similar and fully corroborating the above have been reached in the Columbia Laboratory by Mr. A. P. Mathews in the eggs of *Arbacia* and *Asterias*. In all these cases the egg-centrosome and archoplasm degenerate and completely disappear after formation of the second polar body, and, therefore, do not play any part in the fertilization. The sperm-archoplasm is derived not from the tip of sperm but from the middle-piece (as in the earth-worm and in the axolotl) and by division gives rise directly to the amphiaster of the first cleavage without any participation of an egg-centre or egg-archoplasm. All the stages in the fertilization process of *Toxopneustes* were exhibited by the author in photographs taken with an enlargement of one thousand diameters with the coöperation of Dr. Edward Leaming, of the College of Physicians and Surgeons, New York. These photographs illustrated furthermore the effect upon the egg of various reagents, a considerable number of which have been carefully tested. Fol's picro-osmic mixture was shown to be very defective, causing more or less marked disorganization of the archoplasmic structures and producing various artefacts. The 'centers' (centrosomes) of Fol were unquestionably such artefacts, produced by the shrinking and clotting together of the archoplasmic recticulum. In properly preserved material (sublimate-acetic, Flemming's fluid, etc.,) the archoplasm-masses ('astrospheres') consist of a uniform reticulum and contain no centrosomes.

In a second paper on the '*Polarity of the Egg in Toxopneustes*' Professor Wilson described the results of his observations on the paths of the pronuclei in the transparent living egg. The very unexpected result was reached that in this case the ultimate vertical axis of the egg ('egg-axis' proper) does not necessarily coincide with the polar axis but may form any angle with it; but the plane of first cleavage is nevertheless

always nearly through the entrance-point of the sperm. Regarding the former point there is a possible source of error in that the excentric egg-nucleus may wander from its original position (near the polar bodies), so that the diameter passing through it no longer represents the egg-axis. (This cannot be determined from the polar bodies, since they quickly become detached from the egg). Many facts indicate, however, that such wandering does not occur. If it does not, then the polarity of the egg is not primordial but induced, and one of the most fundamental characteristics of the egg is thus brought into the category of epigenetic phenomena.

Professor Charles S. Minot, of the Harvard Medical School, presented a paper upon *The Olfactory Lobe.* He showed that of eleven layers of cells in the olfactory lobe only the inner two layers belong to the cerebral cortex proper, proving that the olfactory lobe is a ganglion structure belonging to the sensory ganglion series with certain great secondary modifications. This is further supported by the fact that the lobe primarily connects with the brain at a point topographically similar with a point midway between the 'dorsal zone' and the 'ventral zone' of His. In a second paper Professor Minot pointed out as a *Fundamental Difference Between Animals and Plants*, of value principally in teaching, that while animals feed typically upon solids, plants always procure their food in a gaseous or liquid form. This paper was discussed by Dr. Locy, Dr. Humphries and several other botanists and zoölogists present, the point being raised that plants manufacture their own food and that when plant assimilation really begins it is practically analgous to that of animals, as it consists in the taking up of solid particles.

Dr. Arnold Graf, of Columbia, presented the next paper upon *The Origin of the Pigment and the Causes of the Presence of Patterns in Leeches.* The pigment originates in the excretophores. These are wandering cells which pick up excretory substances from the walls of the capillaries; one part of the cells wanders to the funnels of the nephridium and thus delivers their contents into the nephridium, while another part of the excretophores wanders under the skin emerging along the lines of least resistance, which lie between the muscle bundles. The color patterns of the leeches vary, therefore, according to the arrangement of the musculature. In *Nephelis* the longitudinal musculature is developed most strongly and consequently the pattern consists in longitudinal stripes. *Clepsine* has as a consequence of its parasitical mode of life a strongly developed dorso-ventral musculature and therefore the pattern consists in spots, the longitudinal stripes having been interrupted and broken up by the transverse and oblique muscle bundles. The bearing of these facts is very important. The color pattern of the leeches is not in itself adaptive; it is entirely incidental and secondary to the musculature which is essentially adaptive. A change in the musculature would result in a change in the superficial color pattern. This shows how a very striking superficial character may originate without any adaptive significance and as a secondary inheritance.

The following paper by Professor H. T. Fernald, of Central College of Pennsylvania, was entitled *Homoplasy as a Factor in Morphology.* A review of zoölogical literature in the past ten years shows that in every group of animals beginning with the sponges and extending up to the highest vertebrates the phenomenon of parallel or homoplastic development is becoming increasingly apparent. Numbers of cases were cited from all classes of animals showing that identical structures, produced independently in different phyla, are extremely numerous.. The paper was discussed by Professors Hyatt,

Cope and Scott, who pointed out that while the term 'homoplasy' was proposed by Lankaster the phenomenon itself was early pointed out by Darwin and has been fully elucidated by palaeontologists.

Mr. Seitaró Gató, of the Johns Hopkins University, gave a demonstration of some parts of the Ectoparasitic Trematodes including a number of features from his full memoir upon this subject recently published in Japan.

Mr. A. P. Matthews, of Columbia, followed with a paper on the *Morphological Changes in the Pancreatic Cell, corresponding with Functional Activity.* The cells of *Necturus* are exceptionally large and favorable for observation of the changes which occur before and after feeding. The striated appearance of the outer zone of the pancreatic cell is due to coarse cytoplasmic filaments or threads which end in the centre of masses of chromatin within the nuclear membrane. In fact, these threads are directly continuous with the cytoplasmic reticulum in the inner zone; these threads are often coiled and in such cases explain the structures known as *Nebenkerne.* When the gland is secreting the zymogen granules and reticulum are washed out of the cell by lymph currents and new thread substance is manufactured by the chromatin. During the so-called 'rest' of the cell the thread substance degenerates into zymogen granules and the cytoplasmic reticulum of the inner zone. The zymogen granules grow by accretion. The thread substance grows by accretion at the chromatin end. The nucleus undergoes no appreciable changes. There are indications that the chromatin is a ferment, and that it is the essential formative element of the cell; probably this is true of all the cells and all chromatin; if so, the character of cytoplasm and new chromatin formed will depend on the character of the nutrition. It is possible that the chromatin of embryonic cells differentiates as a result of differentiations dependent upon the location in the segmenting cell mass of the chromatin of the original blastomeres. If this is true it is unnecessary to assume that characteristics are represented definitely in a so-called 'stirp' located in the chromatin.

Professor J. S. Kingsley, of Tufts College, next presented a paper upon the *Anatomy and Relationships of Pauropida*, on behalf of Mr. F. C. Kenyon.

Professor Alpheus Hyatt, of the Museum of Comparative Zoölogy, Cambridge, presented a paper summing up his researches upon the *Parallelisms between the Ontogeny and Phylogeny of Pecten.*

Professor Andrews submitted for Professor T. H. Morgan, of Bryn Mawr, some of his observations recently made in Naples at the American table supported by the Smithsonian Institution. It is found that the unsegmented eggs of a sea-urchin may be broken into minute fragments which develop into perfect larvæ. One such fragment may be one-fiftieth of the volume of the egg and yet develop into a gastrula if it contain a male and a female pronucleus. The gastrula thus produced is so exceedingly small that three in a row are no longer than an infusorian, such as *Paramoecium.* The volume of such a gastrula is one-sixty-fourth part of that of a normal gastrula. While the number of cells in a normal blastula on the point of invaginating is five to seven hundred, the number in one of the minute blastulas at the same stage may be as small as sixty. With such facts we explain the known difficulty in rearing larvæ from isolated cells of late cleavage stages, as due to a limit in the number of cleavages possible before gastrulation. That is, gastrulation comes after a definite number of cleavages and a cell has its possible cleavages reduced in a certain ratio by the number of preceding cleavages.

The paper of Professor F. H. Herrick, of

Adelbert College, upon the *Biology of the Lobster* will be printed in full in a later number of SCIENCE.

CURRENT NOTES ON ANTHROPOLOGY (II.).

NATIVE ASTRONOMY IN MEXICO AND CENTRAL AMERICA.

AT the International Congress of Americanists, which met in Stockholm last August, two papers were presented which ought to give pause to those would-be critics who of late years have been seeking to belittle the acquirements of the semi-civilized tribes of Mexico and Central America. Both are studies of the positive astronomic knowledge which had been gained by the observers among those tribes. One is by Mrs. Zelia Nuttall, and bears the title, *Notes of the Ancient Mexican Calendar System.* It is intended merely as a preliminary publication to a thorough analysis of this system as it was carried out in Mexico, and contains only the outlines of her discoveries. These are, however, sufficient to support her thesis, that the astronomer-priests possessed a surprisingly accurate knowledge of the exact length of the solar year, of the revolution of the moon, and of the synodical revolution of the planet Venus.

The second paper is by Dr. Förstemann, who is the foremost student in Germany of the contents of the books written in the hieroglyphic script of the ancient Mayas. He takes up page 24 of the Dresden Codex, and explains its meaning. This page has been long recognized as a sort of abstract or table of contents of those which follow it in the Codex, but its exact bearing has not previously been interpreted. Dr. Förstemann shows by ingenious and accurate reasoning that it relates chiefly to the synodical revolution of the planet Venus and its relation to the courses of the sun and moon.

RECENT AMERICAN LINGUISTIC STUDIES.

IT is gratifying to note that the immense field of native American languages is finding cultivators in many countries.

Even in England, where so little has been done in this direction, a special fund has been raised called the 'vocabulary publication fund,' which prints and issues (through Kegan Paul, Trench, Trübner & Co.) short grammars and vocabularies of languages from MSS. in the possession of learned societies and individuals. The first printed is a grammar and vocabulary of the Ipurina language, by the Rev. J. E. R. Polak. This is one of the Amazonian dialects, and though we were not without some material in it before, this addition to our knowledge is very welcome.

From the same teeming storehouse of Brazil, Dr. Paul Ehrenreich has lately published in the Berlin *Zeitschrift für Ethnologie*, his excellent studies in the language of the the Carayas and Cayapos. They are practically new in matter and form. The Puquinas are a rude tribe who live about Lake Titicaca. M. Raoul de La Grasserie has lately issued (through Koehler, Leipzig) a number of old texts in their language; and Dr. Max. Uhle has collected considerable material in it as spoken to-day. Dr. A. F. Chamberlain, in the American Anthropologist for April last, analyzes a number of neologisms in the Kootenay language; while our knowledge of the remote and confusing dialects of the Gran Chaco has lately been notably increased by the activity of the Argentine scholars, Macedo and Lafone-Quevedo, in editing from rare or manuscript works the notes collected by the early missionaries.

AMERICAN ONOMATOLOGY.

THE study of the meaning and origin of geographical names has a higher purpose than to satisfy a passing curiosity. They are often the only surviving evidences of

migrations and occupancy; they preserve extinct tongues or obsolete forms; and they indicate the stage of culture of the people who bestowed them. Especially useful in these directions are the aboriginal names on the American continent; for the shifting of the native population was so rapid, and the dialects disappeared so quickly, that the place-names are sometimes the only hints left us of the presence of tribes in given localities.

A model study in this field is that of Dr. Karl Sapper in *Globus*, Bd. LXVI., No. 6, on 'The Native Place-names of Northern Central America.' It embraces Guatemala, Chiapas, Tabasco, and portions of Yucatan, Honduras and San Salvador. The aim of the writer is to define the limits of the Mayan dialects, and to explain the presence of Nahuatl influence. He accomplishes his purpose in a thorough manner. Mr. De Peralta, in his *Etnologia Centro-Americana* (Madrid, 1893), did much the same for Costa Rica; and in the Algonkian regions of the Eastern United States, Mr. William Wallace Tooker (in the *American Anthropologist* and other periodicals) has supplied unquestionably correct analyses of the complicated and often corrupt forms derived from that stock.

SOME RECENT EUROPEAN ARTICLES ON AMERICAN ARCHÆOLOGY.

ALTHOUGH some lofty archæologists in the United States display an inability to perceive the value of the antiquities of this continent, it is gratifying to note that this purblindness does not prevail in Europe.

What native American skill could accomplish in the line of true art is well shown by the reproduction on the design on a beautifully colored and decorated vase from Chama, Guatemala, figured by Herr Dieselforff in the *Zeitschrift für Ethnologie*, 1894, Heft V. It will creditably bear comparison with the higher periods of Etruscan technique.

In a publication which has been lately started by the Museum of Ethnography of Berlin, called *Ethnologisches Notizblatt*, Dr. E. Seler, well known for his profound researches into Mexican antiquity, has a copiously illustrated article on the great stone sculptures of the National Museum of Mexico. He identifies several of the figures about which doubt has been entertained.

The Count de Charencey, also an author who has written abundantly on American subjects, has an article in the *Revue des Religions* for June last, on *Les Déformations Craniennes*. Unfortunately, he has not outgrown the theories of Angrand and other obsolete writers, who saw 'Toltecs' and 'Asiatic influence' and the 'Ten Lost Tribes' wherever they turned their gaze in the New World. It is a pity that his real learning should be thus misdirected.

The Report, the ninth, of the British Association on the *Northwestern Tribes of Canada*, contains this year but 11 pages, written by Dr. Boas. At the next meeting it will conclude its labors.

SOME OF ADOLPH BASTIAN'S LATER WRITINGS.

THE untiring activity of Professor Adolph Bastian, who for more than a quarter of a century has occupied the position of Director of the Royal Museum of Ethnography at Berlin, is something amazing.

He but recently returned from a long journey in the Orient, one of the products of which was a remarkable book with a not less remarkable title, *Ideal Worlds according to Uranographic Provinces*, in which he discusses at length the cosmogonies and theogonies of the philosophers of India. This indicates the special direction of his studies of late years. They have turned toward the elementary conceptions of primitive and early peoples concerning the universe, cosmogony and theogony, the nature and destiny of the soul, the life and supposed worlds hereafter, the processes of

thought, the notions of social relation, traced as far into their abstract forms as it was possible for the human mind in that stage of development to conceive and express them.

This tendency is illustrated by the titles of some of his latest issues; as, *Vorgeschichtliche Schöpfungslieder in ihren Ethnischen Elementargedanken; Zur Mythologie und Psychologie der Nigritier in Guinea mit Bezugnahme auf Socialistische Elementargedanken; Wie das Volk Denkt; ein Beitrag zur Beantwortung sozialer Fragen auf Grundlage Ethnischer Elementargedanken*, etc.

These writings are all crammed with wide erudition and mature reflection; but, unfortunately, the author persists in following a literary style of expression which is certainly the worst of any living writer, intricate, obscure, sometimes unintelligible to a born German, as one of his own pupils has assured me. This greatly limits the usefulness of his productions.

D. G. Brinton.
University of Pennsylvania.

THE CONNECTICUT SANDSTONE GROUP.

The attempt to revive the abandoned name of Newark for the older designation of Connecticut, in its application to the Triassic terranes in the Atlantic geographic area, is supported by G. K. Gilbert and opposed by B. S. Lyman, in a joint discussion, in the *Journal of Geology*, Vol. II., No. 1. One would think that the considerations presented by me in the *American Geologist*, Vol. V., page 201, would have been sufficient to satisfy any one looking at the subject judicially and impartially, of the inadequacy of the name Newark to special recognition. In seeking a name for a terrane we should naturally inquire, *first*, where is the area which exhibits best the typical features? In answer to this we have the fact that in the Connecticut area the early exploration was the most thorough, the very unique occurrence of fossil footmarks was first recognized, and is the only one in which they have been thoroughly studied. At first these were thought to have been made by birds; but the later suggestion of deinosaurs has been verified by the masterly restorations of Anchisaurus by Prof. O. C. Marsh, obtained in the same Connecticut valley. Reptilian bones were known also from Pennsylvania, but no one has ever connected them with the tracks. Thus the feature which characterizes the American Trias is found in its perfection in the Connecticut and not in the Newark area. The fish are also more abundant in the first named area. The other features of importance are the coal and fossil plants, and these are best developed in a Virginia area.

Second. It is essential for the suitability of a geographical term, that the locality be one where the terrane should be exhibited in its entirety or maximum. The Connecticut valley has the whole series. The city of Newark 'does not contain one-fourth part of the thickness of this sandstone, and that which is visible is only a fraction of this fourth.' This early statement of mine is confirmed by Mr. B. S. Lyman, who says the exposures at Newark amount to 'one-tenth or one-twentieth of the beds to be included in the name.' Mr. Lyman has still later called attention to the probability that the Newark beds belong to the Permian instead of the Triassic.

Third. The name of Connecticut or Connecticut river sandstone has precedence over Newark. It was both in actual use before the suggestion of Newark, and was again proposed and used after 1856 and before 1892, because no one except Mr. Redfield employed the term Newark. The proposal was never accepted by the geological public.

In the early days of geology the use of local names was confined to the groups like

Silurian and Devonian. It was not until geologists found it necessary to specify the smaller divisions that it was discovered how convenient they were. The first users of names like Potsdam and Trenton did not make formal announcements that hereafter a particular name would be applied to a definite set of beds with special paleontological characteristics. It was the 'sandstone of Potsdam,' the 'limestone of Trenton Falls,' enunciated almost apologetically. We would not to-day question the validity of these early names because their authors did not set them forth in their perfection, like Minerva springing forth from the brain of Jupiter. I find the suggestion of Connecticut to have been made by E. Hitchcock in his report upon the Geology of Massachusetts in 1833, page 209. He says, 'the group which I denominate *new red sandstone in the Connecticut valley*' (the italics are mine). This was repeated in the Final Report, p. 441. Like his contemporaries he preferred the use of the European term of Trias, New Red or sometimes Liassic to the geographical one. We note that the expression of new red sandstone in the Connecticut valley is fully as definite as the later one of sandstone of Potsdam. This usage of Connecticut appears in all of E. Hitchcock's papers, and he distinctly included the terranes of New Jersey, Virginia and North Carolina. I quote later samples of its use. In the Ichnology of New England, 1858, page 20, may be found the following heading descriptive of an extended discussion; '5. Conclusions as to the Age and Equivalency of the Connecticut River Sandstone.' In 1859 he published in the Report of the Secretary of the Massachusetts Board of Agriculture a catalogue of the State Collection. The following is the headingused descriptive of the specimens from this terrane: "CONNECTICUT RIVER SANDSTONE. (*Liassic and perhaps Triassic and Permian sandstones and limestones.*)"

In 1860 Messrs. H. and C. T. Smith, 356 Pearl street, New York, published a wall map of Hampshire county, Massachusetts, based upon the surveys of Henry F. Walling. Hundreds, perhaps thousands, of these maps adorned the walls of houses belonging to citizens of that county. Upon it was placed a geological map of the county by Edward Hitchcock, and in explanation of the colors we have 'Connecticut River Sandstone, Lower and Upper,' and the words New Red or Trias do not appear at all. Thus the usage of the name Connecticut in the writings of this author has been constant and has passed from the employment of both the European and local terms conjointly to the use of the latter one exclusively.

Other earlier authors employed the geographical name in a geological sense. Thus Lyell in his Travels, 1845, page 100, Vol. 2, says 'the Connecticut deposits.' Dr. James Deane constantly speaks of the Connecticut river sandstone; and in his final work upon the footmarks, a quarto with 61 pages and 46 plates, published by Little, Brown & Co., Boston, in 1861, his title is 'A Memoir upon the Fossil Footprints and other Impressions of the Connecticut River Sandstone, by James Deane, M. D.'

Roderick Impey Murchison, in his anniversary address before the Geological Society of London, 1843, page 107, etc., speaks of the 'deposit in Connecticut' and the 'ornithichnite and Paleoniscus beds of Connecticut.'

Dr. John C. Warren, President of the Boston Society of Natural History, is reported as having given 'an historical account of the science of Ichnology, particularly as illustrated by the fossil footprints in the Connecticut River Sandstone;' Nov. 2, 1853, *Proc. B. S. N. H.*, Vol. IV., p. 376. Various remarks of his on these subjects were printed in 1854 in a book entitled '*Remarks on Some Fossil Impressions in the*

Sandstone Rocks of Connecticut River,' by John C. Warren, M. D., President of the Boston Society of Natural History.

Prof. W. B. Rogers, at a meeting of the Boston Society of Natural History, June 20, 1855, spoke of the discovery of the fern Clathropteris in the 'Connecticut River Sandstone.'

The use of the name Connecticut River Sandstone as applied to the rocks in question seems to have been universal among the members of the Boston Society of Natural History in the fifties, and it is applied as a matter of course in the index in Vols. V., VI., VII., etc. Mr. T. T. Bouvè also uses the expression prior to 1855.

A sufficient number of citations have now been made to prove the frequent application of the term Connecticut River Sandstone to the Triassic terranes before the proposal of W. C. Redfield in 1856 to apply the designation of Newark to the same. Others could be added. But I will in the next place call attention to the fact that no one had followed Redfield's suggestion till 1889, a period of a *third of a century*, until Mr. I. C. Russell proposed to revive the name of Newark. Every American geologist by his silence indicated his disapproval of the suggestion. Furthermore, the use of the expression Connecticut had become pronounced. In fact, its use, coupled with the rejection of Newark, is sufficient to establish the usage of the former without any regard to the usage previous to 1856. I will cite a few instances of its use. The catalogue of the Massachusetts State Cabinet in 1859, the Ichnology in 1858, the map of Hampshire county, 1860, and the title of Dr. Deane's book in 1861, belong to this category. H. D. Rogers, in the Geology of Pennsylvania, 1858, prefers the term 'older Mesozoic,' but certainly rejects the use of Newark, as he makes no reference to it, and uses the following expressions: 'The vegetable fossils in the Connecticut sandstone;' 'the organic remains in the Connecticut red sandstone.' A title, 'Red Sandstones of the Connecticut Valley.' Roswell Field 'made a verbal communication on the footmarks of the Connecticut river sandstones' before the Boston Society of Natural History, June 6, 1860. In 1859, at the Springfield meeting of the A. A. A. S., he discusses the ornithichnites of the 'sandstone of the Connecticut valley.' This paper was reprinted the following year in the *American Journal of Science.*

Prof. O. C. Marsh presents in a section illustrating the occurrence of vertebrate life in America the name of *Connecticut river beds* which includes all the Atlantic areas. This has been printed with his 1877 address before the A. A. A. S., the third edition of Dana's Manual of Geology, 1880, the monograph on the Dinocerata, 1885, etc.

Prof. Joseph Le Conte in his Elements of Geology, 1878, and later editions describes the eastern Jura-Trias under the head of *Connecticut river valley sandstone.*

Prof. J. P. Lesley in C 4 of Second Pennsylvania Survey, p. 179, 1883, says, "American geologists now write habitually of the *Triassic red sandstone* of the Connecticut valley and of North Carolina." Although the Newark area was through Pennsylvania he prefers to select the locality name from either of the other principal areas. There are two references to the want of acceptance of the term Newark. I had the pleasure of attending Prof. J. D. Dana's course of lectures on Geology at Yale College in 1856. I noted that he then mentioned the fact that Mr. Redfield had proposed the name of of Newark for the American Trias. But he has never used the name in any publication, evidently for good reasons. In a sketch of the Geology of Massachusetts with map in Walling's Official Atlas, 1871, the following is printed, written by myself: "W. C. Redfield proposed the name of Newark sandstones for the group; but besides being inappropriate, it was of later

date than the appellation of Connecticut."

This review of the usages of names for the trias shows that the name of Connecticut was distinctly proposed by E. Hitchcock in 1833, and was constantly used by the geologists specially interested in those works before 1856: W. C. Redfield proposed the name of Newark for the terranes in 1856: that instead of accepting the name geologists universally employed the name of Connecticut when using a local designation up to 1889: that in this period there were several unmistakable formal proposals of the use of Connecticut: and that there were in this period allusions to the fact that the name of Newark was not accepted. Even Mr. Russell, in his learned paper of 1878, used the name of Triassic in preference to Newark.

Mr. Gilbert mentions three 'qualifications of a geographic name for employment in stratigraphy, (1) definite association of the geographic feature with the terrane, (2) freedom of the term from pre-occupation in stratigraphy, (3) priority.' These are acceptable with the addition of a fourth, appropriateness of application. All of these qualifications are possessed by the term Connecticut, while the term Newark cannot satisfy a single one of them.

C. H. HITCHCOCK.
DARTMOUTH COLLEGE.

LENGTH OF VESSELS IN PLANTS.

THE diameter of pitted and other vessels is easily measured upon the cross-section of any stem, but their length is less readily determined. Probably, if the question were put, a majority of botanists would say that they rarely exceed a few inches in length, especially if they still believe with Sachs that the water ascends through the walls of the vessels. As a matter of fact, the spiral and pitted vessels of plants often form open passageways of great length. Some experiments made upon woody stems by Strassburger (*Ueber den Bau u. die Verrichtungen der Leitungsbahnen in den Pflanzen*) seem to place this beyond dispute. His method of procedure was to fasten a glass tube to the upper end of a cut stem by a rubber band, insert a funnel into the upper end of the tube, and subject the cut surface to the pressure of a column of mercury kept at a uniform height of twenty centimeters, successively shortening the stem until mercury appeared at the lower end. Using this method, he obtained the following results:

(1.) In a branch of *Quercus rubra*, 1.5 meters long and about three centimeters thick, mercury ran out of thirty vessels on the lower cut surface almost as soon as it was poured into the funnel. When the branch was shortened to one meter fifty-four to fifty-six vessels were permeable. In a slender branch of *Quercus pedunculata*, one meter long, thirty-five vessels dropped mercury, and when this was shortened to one-half meter mercury came out of more than 100 vessels. Another branch five centimeters thick at the base and 3.6 meters long was tried, and drops of mercury fell in quick succession from eight vessels. In *Quercus Cerris* mercury came through seven vessels of a branch four meters long and six centimeters thick at the base. Shortened to 3.5 meters nine vessels dropped mercury; at three meters, twelve vessels; at 2.5 meters, numerous vessels. *Conclusion:* Vessels two meters long are quite common in the oaks, and it is probable that single vessels may be as long as the stem itself.

(2.) In *Robinia Pseudacacia*, a branch two meters long and three centimeters thick was impermeable and first let through mercury when shortened to 1.18 meters. Then it dropped from four vessels. Successively shortened mercury dropped from an increasing number of vessels as follows: One meter, nine vessels; fifty centimeters, thirty-eight vessels; twenty-five centimeters, fifty-seven vessels.

(3.) A stem of *Wistaria* 1.75 meters long and having seven internodes dropped mercury from seven vessels. Another stem three meters long and containing forty-seven internodes was first killed by heating for an hour in water at 90°, and then dried. This did not let mercury through until it had been shortened to 2.5 meters. Then it dropped pretty fast from four vessels. Reduced to two meters, nine vessels dropped mercury, and out of some it ran rapidly. Another shoot gave nearly the same results. A fresh and very long stem had to be shortened to three meters before mercury came through. Then it dropped from three vessels. Successively shortened, the number of permeable vessels was as follows: 2.5 meters, eleven vessels; two meters, eighteen vessels; 1.5 meter, twenty-seven to twenty-nine vessels. These stems were one to two centimeters thick. *Conclusion:* Some of the vessels in *Wistaria* are quite long, though scarcely more than three meters. Most of the wide vessels are about one meter long.

(4.) A cane of *Vitis Labrusca* 1.2 centimeter thick, which was previously killed by heating for an hour in water at 90° C. and then air-dried, first let mercury through (3 vessels) when shortened to 2.2 meters.

(5.) A shoot of *Aristolochia Sipho* 1.5 centimeters thick, 2.5 meters long, and having fifteen internodes was killed in the same way. This let mercury through fourteen vessels. Another shoot 2.1 meters long let the mercury through many vessels. A fresh stem five meters long, the longest he could get, dropped mercury from five vessels. When successively shortened, more and more vessels dropped mercury. At 3.5 meters twenty-five vessels let it through, and when the stem was cut down to three meters the number of vessels dropping mercury could not be determined. *Conclusion:* In this plant numerous vessels are three meters long, some are five meters long, and a few are probably longer.

In *Aristolochia* the vessels of different annual rings were equally permeable, but in the wistaria, the locust and the oaks the permeable vessels were mostly on the periphery. The records were made in from ten to thirty minutes from the beginning of the pressure, the time depending on the length of the stem. In general the mercury was passed through the stem in the same direction as the ascending water current, but a change of direction did not give contradictory results. These experiments were repeated, using a pressure of forty centimeters, but even this did not rupture any cross-walls. This increased pressure overcame the capillary resistance and forced the mercury through many smaller vessels, but otherwise the results were much the same.

Erwin F. Smith.

Washington.

SCIENTIFIC LITERATURE.

Introduction to Elementary Practical Biology.—By Charles Wright Dodge, M. S.—Harper Bros., New York. 1894.

This book is a laboratory guide for high school and college students. The teacher of biology who is endeavoring to train his students in the best manner is in modern times, amid the abundance of laboratory guides, in very much of a quandary as to the best of two opposite methods. If, on the one hand, he puts a laboratory guide into the hands of the student, the result is apt to be that the student soon learns simply to verify the facts mentioned in the book, and thus loses all stimulus for original observation, which should be the foremost result of practical work in biological science. On the other hand, if the teacher gives to an elementary student a specimen to study without laboratory directions, he is at such complete loss to know how to proceed, what to do, and particularly what points to notice, that a large proportion of his time is wasted through sheer lack of the proper

knowledge of methods. To force a student to invent methods does stimulate indeed observation, but it is a very great waste of time on the part of most students. Between this loss of stimulus to original observation and the loss of time, the instructor is very puzzled how to proceed.

Prof. Dodge of Rochester University in the guide just published has attempted to solve the problem by a new method of direction. The laboratory guide here noticed gives the student some few directions as to methods of dissection and methods of procedure, but beyond this gives him practically no information in regard to his specimens. By a series of skilfully arranged questions it forces the student to make his own observations and to make them in the right direction. Instead of directing the student to observe a certain fact a question is asked which leads him to hunt for a solution, and the result is independent observation. This method of study renders the text book of no value unless the student has the specimen directly in front of him, for there is no possibility of answering these questions in any other way than from the specimen.

The method of teaching here planned is certainly an ideal one and has been quite successfully carried out by Prof. Dodge. It is true that the questions given are sometimes entirely beyond the possibility of the student's solution, and it must also be recognized that this method is one designed to occupy a very great amount of time. Some of the problems which are set before the student will require days for solution, and others have not yet been settled by the observation of scientific investigators. It will therefore take a great amount of time to complete the outline given, for the book is a comprehensive study of biology, including the study of the animal and vegetable cell, on the side of animals, the study of the sponge, hydra, campanularian hydroid, star fish, earthworm, the lobster, locust, clam, and the frog; and on the side of the vegetable kingdom, green felt, stone work, rock weed, mould, mushrooms, liverworts, ferns and flowering plants. Whether the student in the time allotted to the study of general biology even in our best colleges will be able to complete the list by the method outlined in the guide is doubtful, but there can be little doubt that the method of teaching adopted by Prof. Dodge in this book is an ideal one, and for stimulating observation and at the same time enabling the student to do the most work in the smallest amount of time, there is perhaps no laboratory guide in biology yet published which succeeds as well as the one here noticed.

H. W. CONN.

WESLEYAN UNIVERSITY.

Le Grisou [Fire Damp], par H. LE CHATELIER, Ingénieur en Chef des Mines.—Professeur à l'École nationale des Mines.—Paris, Gauthier Villars et Fils, 1894. Pp. 187. Broché 2 fr 50, Cartonné 3 fr.

The rapid extension of technical scientific knowledge, and the increasing call for specialists in every department, is best shown in the literature of the past few years. The discussion of general topics within the limits of a single volume is now possible only in the most elementary works designed for beginners and for the lower classes of our colleges. We have in place of the general text book a rapidly increasing library devoted to special subjects, each presented by specialists in their own field and each treating of some small part of the great sciences formerly considered as a unit. The present volume is of this nature, and, coming from the hand of an engineer of wide reputation, will be of great service to all advanced students of mining whether still within the college confine or employed in the active practice of their profession. 'Fiery' mines are common in our coal fields, and many mines long worked without suspicion of danger, or with

carelessness engendered by delayed casualty, suddenly become the scenes of disaster and great loss of life. M. Le Chatelier has brought together a great mass of facts from many sources and has so presented them as to place them conveniently within reach of all workers in the field. Part I. treats of the nature and production of fire damp, its composition, manner of explosion, its limit of inflammability, and other properties, physical and chemical. Part II. is highly practical and is devoted to the consideration of the immediate cause of accidents, with precautions against the same, the use of safety lamps and of safety explosives, etc. To those desiring a more extended treatment of any of these subjects, or those wishing to consult original papers, the very complete Bibliography which is given at the end of the work will be of great service, particularly as a guide to continental publications.

Charles Platt.

Philadelphia.

At the North of Bearcamp Water.—Chronicles of a Stroller in New England from July to December.—By Frank Bolles.—Houghton, Mifflin & Co., 16 mo. pp. 297.

Any one who will go afield in the rain for the purpose of seeing how the wet birch trees look, or who will stay through a stormy night on a mountain top for the sake of the scenery, has certainly a lively interest in nature. The late Frank Bolles had all of this interest and in addition a kindly sympathy with every wandering creature. In his last book, *At the North of Bearcamp Water*, one does not find as many paragraphs suitable for quotations on a daily calendar as would occur in a volume of Thoreau, but his description of a July afternoon when "The air was full of quivering heat and hazy midsummer softness," has all the strength of beauty and truth.

The book particularly describes nature in the vicinity of Chocorua mountain, but there are also chapters on Old Shag, Bear and other White Mountain peaks. In these accounts of scenery of deer, foxes, birds and trees there is an evident truthfulness, as real as the objects themselves. The mass of detail brought into some of these chapters is surprising, and a frog did not jump across the path without being made to play his part in the account of the day's ramble.

Among the most interesting pages are those devoted to 'A Lonely Link,' and to 'A Night Alone on Chocorua.' Mr. Bolles had his red roofed cottage by the lake and describes the squirrels, muskrats, porcupines, and many birds that were his neighbors. The narrative is peaceful in tone, as restful as a quiet ramble in the woods, and those who wish to be transported in spirit to pleasing natural scenes will do well to accept Mr. Bolles as guide.

W. T. Davis.

NOTES.

THE BOTANICAL SOCIETY OF AMERICA.

The Botanical Society of America was organized during the meeting of the American Association for the Advancement of Science at Brooklyn, N. Y., in August, 1894. The following extracts from the Constitution adopted are of general interest.

"There may be two classes of members—active and honorary. Only American botanists engaged in research, who have published work of recognized merit, shall be eligible to active membership. Before the 1st of January following his election, each active member shall pay into the treasury of the Society a fee of twenty-five dollars ($25), and thereafter annual dues to the amount of ten dollars ($10), payable before the 1st of January."

"Candidates for active membership shall be recommended by three active members of the Society not members of the Council, who shall certify that the candidate is eligible under the provisions of the Constitution. These nominations shall be placed in

the hands of the Secretary at least three months before the meeting of the Society which is to act on them. Two months before said meeting, the Secretary shall cause to be prepared and sent to each active member of the Society a list of the nominees, indicating the residence, occupation and qualifications of each and the names of those recommending him."

"The officers of this Society shall be a President, Vice-President, Secretary and Treasurer. Their duties shall be those usually performed by such officers in other bodies, and such additional duties as may be prescribed by the Constitution of this Society. They shall hold office through the annual meeting following the year of election, and until their successors have been elected and qualified. An address shall be delivered by the President at the annual meeting two years after his election."

"The officers, together with the last Past-President and two members elected by the Society at its annual meeting, shall constitute a Council, which shall be charged with such duties as are prescribed by the Society, and shall represent the Society in the interval between meetings of the latter, reporting any *ad interim* action at the next general meeting of the Society; but acts of the Council not specified in the Constitution, or for which special power has not been conferred by the Society, shall be binding on the latter only after they have been reported and approved at such general meeting. The Council shall constitute a Publication Committee, charged with editing, publishing and distributing such publications as may be authorized by the Society, and they shall have the power to select from their own number or the membership of the Society an editor to whom they may delegate the immediate duty of editing such publications. They shall all constitute a Board of Curators for the property of the Society, subject to such rules as are provided in the Constitution or otherwise prescribed by the Society."

"The Society shall hold an annual meeting at such time and place as the Council each year may select; and special meetings for the presentation of papers or the transaction of business, at such other times and places as the Society or Council may from time to time deem necessary."

The officers for the present year are: Prof. Wm. Trelease, Missouri Botanical Garden, President; Prof. N. L. Britton, Columbia College, New York City, Vice-President; Prof. C. R. Barnes, University of Wisconsin, Madison, Wis., Secretary.

PSYCHOLOGY.

The department of Philosophy and Psychology at Chicago has been made this year one of the strongest in America. Professor Dewey, formerly of the University of Michigan, has accepted a call to the Head Professorship of Philosophy; Mr. G. H. Mead, also of the University of Michigan, has been made assistant Professor of Philosophy; Mr. J. R. Angell, formerly of the University of Minnesota, has been made assistant Professor of Psychology, and Mr. S. F. McLennan has been made assistant in Psychology.

ARTICLES ON SCIENCE.

Among the articles of scientific interest in the popular magazines are the following:

A New Flying Machine, Abram S. Maxim (*Jan. Century*); Want of Economy in the Lecture System, John Trowbridge; The Genius of France, Havelock Ellis; Gallia Rediviva, Adolphe Cohn (*Jan. Atlantic Monthly*); The World's Debt to Astronomy, Simon Newcomb (*Dec. Chautauquan*); The World's Debt to Chemistry, H. B. Cornwall (*Jan. Chautauquan*); Mental Characteristics of the Japanese, George Trumbull Ladd (*Jan. Scribner's*); Heredity, Part III., St. George Mivart (*Jan. Humanita-*

rian); Recent Science, Prince Krapotkin (*Dec. Nineteenth Century*).

Nature has reprinted (Dec. 13 and 20) in full the interesting address on *Endowment for Scientific Research and Publication* given by Mr. Addison Brown before the Scientific Alliance of New York, and published in the Report of the Smithsonian Institution for 1892.

Mr. Kumagusu Minakata has written, in view of the claims of priority recently made by two English writers, a letter to *Nature* (December 27), calling attention to the use of 'finger-prints' as a means of signing documents and identification in the laws and usage of China and Japan as early as 650 A. D.

The *Naturwissenschaftliche Rundschau* is publishing in its current numbers an account of the sixty-sixth *Versammlung der Gesellschaft deutscher Naturforscher und Aerzte*, held last year in Vienna.

FORTHCOMING PUBLICATIONS.

Following the publication of H. M. Ward's translation of Hartig's *Text-book of the Diseases of Trees*, the same publishers (Messrs. Macmillan & Co.) announce as nearly ready three other important translations: Rätzel's Völkerkunde, translated by A. J. Butler; the article *Construction* from Viollet le Duc's *Dictionnaire raisonné de l' architecture française*, translated by G. M. Duss, and Paulsen's *Universities of Germany*, translated by E. D. Perry, of Columbia College.

There will be issued this month as a supplement to *The Psychological Review* a *Bibliography of Psychological Literature for 1894*, compiled by Dr. Livingston Farrand, of Columbia College, and Mr. Howard C. Warren, of Princeton College. The bibliography will include so far as possible all books, monographs and articles in Psychology, and those publications in philosophy, biology, anthropology, neurology etc., which are important for psychology.

AN *Année Psychologique*, edited by Professor Alfred Binet, will be issued in March.

MESSRS. MACMILLAN & Co., announce for early publication *A Rural Science Series*, edited by Professor L. H. Bailey, of Cornell University.

SCIENTIFIC JOURNALS.

THE BOTANICAL GAZETTE, DEC.

Contribution to the comparative histology of pulvini and the resulting photeolic movements. (With plate XXXIV.) F. D. HEALD.

Two new ferns from New England: GEORGE E. DAVENPORT.

Some notes on the Leguminosæ of Siam: GLENN CULBERTSON.

Briefer Articles; Editorial; Current Literature; Notes and News; General Index.

THE PSYCHOLOGICAL REVIEW, JAN.

Hermann von Helmholtz and the New Psychology: C. STUMPF.

The Theory of Emotion (II.); The Significance of Emotions: JOHN DEWEY.

The Muscular Sense and its Localization in the Brain Cortex: M. ALLEN STARR.

A Location Reaction Apparatus: G. W. FITZ.

Discussion:—PAUL SHOREY; H. M. STANLEY; H. R. MARSHALL; E. B. TITCHENER.

Psychological Literature; Notes.

THE ENGINEERING MAGAZINE, JAN.

Silver Coinage Historically Considered: H. D. MCLEOD.

Modern Theories as to Electricity: HENRY A. ROWLAND.

The Drainage System of the Valley of Mexico: HON. M. ROMERO.

Practical Hints for City Officials: E. C. GARDNER, LEWIS M. HAUPT.

Selecting Motive Power for a New Plant: CHARLES E. EMERY.

Plumbing Trade Schools and Their Influence: E. N. G. LEBOIS.

Laboratory Training for Mining Engineers: R. H. RICHARDS.

Operating Machine Tools by Electricity: GEORGE RICHMOND.

First Principles in Architecture: WM. HENRY GOODYEAR.

SOCIETIES AND ACADEMIES.

THE LINNÆAN SOCIETY.

THE Linnæan Society of New York City, in coöperation with the American Museum of Natural History, has arranged for a series of illustrated lectures to be given in the large lecture hall of the museum, on Tuesdays at 8 P. M. The lectures are:—

FRANK M. CHAPMAN, assistant Curator in the American Museum of Natural History. *A Trip through the Lesser Antilles.* Physical and Natural History of the Islands, their Products and Inhabitants. January 8.

HENRY FAIRFIELD OSBORN, Sc. D., Da Costa Professor of Biology, Columbia College. *The Great West, a Half Million Years Ago.* An account of our Continent when it was separated from South America and joined to Asia, and the Climate and Vegetation were Sub-tropical. February 5.

WILLIAM LIBBEY, JR., Sc. D., Professor of Physical Geography and Director of the E. M. Museum of Geology and Archæology, Princeton College, New Jersey. *Hawaii, the Paradise of the Pacific.* March 12.

FREDERICK W. PUTNAM, Professor of American Archæology and Ethnology in Harvard University, and Curator of Anthropology in the American Museum of Natural History. *Ancient Earthworks in the Ohio Valley.* April 2.

UNIVERSITY ARCHÆOLOGICAL ASSOCIATION.

The University Archæological Association of Philadelphia offers a course of lectures to be given at 4 p. m., in the Library building of the University of Pennsylvania, as follows:—

January 9.—MR. TALCOTT WILLIAMS, *Some Morroccan Relations.*

January 16.—DR. DANIEL G. BRINTON, *The Beginnings of the Fine Arts.*

January 23.—MR. HENRY G. BRYANT, *Notes on the Most Northern Eskimos.*

January 30.—DR. HARRISON ALLEN, *The Human Skull; what is its Place in a Museum of Archæology?*

February 6.—CAPTAIN RICHARD S. COLLUM, U. S. M. C., *The Evolution of Small Arms.*

February 13.—DR. DANIEL G. BRINTON, *Love Charms and Tokens.*

Eebruary 20.—MR. STEWART CULIN, *The Wand of the Conjuror.*

STEWART CULIN, *Secretary.*

THE ROCHESTER ADADEMY OF SCIENCE.

Program of Meetings, 1895.

January 14.—Annual Meeting; Election of Officers; Illustrated Paper by the President, PROF. H. L. FAIRCHILD, *The Geology of the Pinnacle Hills.*

January 21.—EMIL KUICHLING, *The New Conduit of the Rochester Water Works.*

January 28.—Popular Lecture, J. D. MALLONEE, *The Structure of Rocks as Shown by Polarized Light.*

February 11.—J. STANLEY-BROWN, *The Pribilof Islands and the Seal Industry.*

February 25.—J. EUGENE WHITNEY, *The Depotism of the Plurality.*

March 11.—CHARLES H. WARD, *The Teeth of Man.*

March 25.—PROF. W. W. ROWLEE, *The Evolution of Seeds.*

April 8.—CHARLES WRIGHT DODGE, *Diphtheria and Anti-toxine.*

April 22.—ADELBERT CRONISE, *The Panama Canal.*

May 13.—RICHARD M. MOORE, *The Coleopterous Fauna of Rochester and Vicinity.*

May 27.—H. L. FAIRCHILD, *Glacial Lakes of Western New York.*

June 10.—H. L. FAIRCHILD, *The Geology of Irondequoit Bay.*

AMERICAN SOCIETY OF CIVIL ENGINEERS.

December 19.

MANSFIELD MERRIMAN, *The Strength and Weathering Qualities of Roofing Slates.*

This paper, which will be published in the transactions of the Society, about February 1st, gave an account of original physical and chemical tests of the properties of different slates.

GEOLOGICAL SOCIETY OF WASHINGTON.

January 9.

MR. J. S. DILLER, *Artificial wire silver, prepared by* F. C. PHILLIPS.

MR. G. P. MERRILL, *On the disintegration of the granitic rocks of the District of Columbia.*

MR. W. LINDGREN, *Characteristic features of the gold quartz veins of California, with specimens.* WHITMAN CROSS, *Secretary.*

THE BIOLOGICAL SOCIETY OF WASHINGTON.

January 12.

L. H. BAILEY, *The Plant Individual in the Light of Evolution.*

FREDERIC A. LUCAS, *Secretary.*

BOSTON SOCIETY OF NATURAL HISTORY.

January 14.

J. WALTER FEWKES, *The new fire ceremony at Walpi.* SAMUEL HENSHAW, *Secretary.*

THE NEW YORK ACADEMY OF SCIENCES.

SECTION OF BIOLOGY.

Exhibition of microscopical and lantern slides with notes on technique.

R. H. CUNNINGHAM, *On the Sources of Illumination for Photo-micrography.*

C. F. COX, *The Lantern Slides of* MR. E. F. SMITH, *F. R. M. S., of London, illustrating the latest Theories of Diatom Structure.*

O. S. STRONG, *Notes of new histological Nerve Methods.*

EDWARD LEAMING, *Exhibition of photomicrographic slides, bacteriological, neurological, biological.*

BASHFORD DEAN, *Secretary.*

THE NEW YORK ENTOMOLOGICAL SOCIETY.

January 15.

Meeting at American Museum of Natural History.

R. L. DITMARS, *Notes on a collecting trip through Connecticut.*

LEWIS H. JOUTEL, *Secretary.*

NEW BOOKS.

Radiant Suns. AGNES GIBERNE. New York, Macmillan & Co. 1894. Pp. vii+328.

Race and Language. ANDRÉ LEFÈVRE. New York, D. Appleton & Co. 1894. Pp. vi+424.

Die Samoanische Schöpfungs-Sage und Anschliessendes aus der Sudsee. ADOLF BASTIAN. Berlin, Emil Feller. 1894. Pp. 50.

Die Gross-Schmetterlinge Europas. PROF. ERNST HOFMANN. 2d Ed. C. Hoffmann. 1894. Pp. xl+24. M. 28.

Model Engine Composition with Practical Instructions to Artificers and Amateurs. J. ALEXANDER. London, Whittaker & Co.; New York, Macmillan & Co. 1894. Pp. viii+324. $3.00.

Ein geologische Querschnitt durch die Ost-Alpen. A. ROTHPLETZ. Stuttgart, E. Schweizerbart. 1894. Pp. iv+268. M. 10.

Geotektonische Probleme. A. ROTHPLETZ, Stuttgart, E. SCHWEIZERBART. 1894. Pp. 175. M. 8.

Biological Lectures Delivered at the Marine Biological Laboratory of Wood's Hall, Boston. GINN & Co. 1894. Pp. 242.

Introduction to Chemical Analysis for Beginners. FR. RUDORFF. Translated from the Sixth Edition by CHARLES B. GIBSON and F. MENZEL. Chicago, The W. T. Keener Co. 1894. $1.00.

The Etiology of Osseous Deformities of the Head, Face, Jaws and Teeth. EUGENE S. TALBOT, 3d Ed. Chicago. The W. T. KEENER Co. Pp. xvi+487, $4.